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**STUDIES IN COCCINELLIDÆ.**

BY GEORGE H. HORN, M.D.

The Coccinellidæ of Boreal America have been nearly completely monographed by Crotch (Trans. Am. Ent. Soc., 1873), who omitted *Scymnus* and the genera with small species. In 1880 (Trans. Am. Ent. Soc.) LeConte reviewed *Hyperaspis*. The Scymnides have never been studied since the earliest work by LeConte (Proc. Acad. 1852). The present paper was begun with the idea of supplementing the works above cited, having *Scymnus*, especially, in view.

In no family of the entire order have genera been so unnecessarily multiplied and founded on characters impossible of accurate definition, the work of Mulsant being an instance of minute subdivision in every respect. The later work of Crotch, while partly correcting this unnecessary subdivision, has in many places fallen into the same error. Chapuis (Genera Col. xii) has greatly simplified the classification in the number of the larger subdivisions of the family and of the genera.

As an instance of the difficulties met in the arrangement of the genera *Coccidula* may be taken as a beginning. This genus is separated from the other pubescent Coccinellidæ by the existence of some larger elytral punctures substriately arranged. While this will answer fairly for the European species and our *lepida*, it fails for *occidentalis*. LeConte has, however, suggested a more important character (Classif. 1883, p. 114) in the fact that the anterior coxal cavities are open behind.

In describing *Cephaloscymnus* (Trans. Am. Ent. Soc., 1873, p. 382) Crotch observes the same character. From this it is evident that the taxonomic value given it by LeConte cannot be accepted without unnaturally associating the two genera. From the characters proposed by Chapuis *Cephaloscymnus* should be placed in the Ortaliites, and I would remove *Novius* from the Scymnites to the same group.

Another difficulty arises in the species at present called *Pentilia* in our lists. By the arrangement suggested in the Classification these species fall in the Hyperaspites, but the table does not seem applicable outside of our fauna.

The species at present known as *Pentilia* in our lists must be placed in *Smilia* Weise (Deutsche Ent. Zeit. 1891, p. 285), and while they have no epipleural fossets as required in the Hyperaspites it seems unnatural to remove *Smilia* from association with *Lotis*, *Sticholotis* and *Cryptognatha*. In all these genera there are but five ventral segments, whereas in the other Hyperaspites there are at least six. The essential character of *Smilia* is the presence of an obliquely impressed line behind the anterior angles of the thorax. This line is scarcely visible in *misella*.

**SMILIA** Weise *Pentilia* ‡ Lec.

The species are all quite small, the largest being but little longer than one millimetre, the smallest less than one millimetre.

The species may be thus separated :

Impressed line of front angle of thorax very indistinct.

Thorax smooth; sutural stria of elytra indistinct.....**misella**.

Impressed line distinct.

Elytra uniform in color, piceous or black.

Thorax distinctly punctate; elytra brownish, sutural stria distinct behind the middle.....**marginata**.

Thorax not evidently punctate, but finely alutaceous, elytra piceous or black, sutural stria not evident.....**ovalis**.

Each elytron with oval red spot, the two narrowly separated at suture.

Thorax not punctate, sutural stria not distinct.....**coccidivora**.

**S. misella** Lec., Proc. Am. Philos. Soc., 1878, p. 400.

Widely distributed from Canada to Florida, Illinois to Texas.

**S. marginata** Lec., loc. cit.

Marquette, Mich., and Ithaca, N. Y.

**S. ovalis** Lec., loc. cit.: *Felschei* Weise, Deutsche Ent. Zeit. 1891, p. 288.

Florida. I have also specimens from southern California not distinguishable, except they are more evenly black in color; one is labeled "collected on *Pinus monophylla*."

**S. coccidivora** Ashmead, "Orange Insects" (printed privately), Jacksonville, Fla., 1880, p. 10.

Depredates on the scale insects of the orange.

**CRYPTOGNATHA** Muls.

The species of this genus are known from any others in our fauna by the prosternum in front forming a lobe concealing the mouth-parts in repose. The middle and hind legs are received when re-

tracted in depressions, and the knees form foveæ in the epipleuræ even to their outer edge. There is to be seen a faintly impressed line near the front angles of the thorax, closer, however, to the front angles and less impressed than usual in *Smilia*.

These species are known :

Black shining, head and sides of thorax often pale; length .07 inch. . . **pusilla**.  
Castaneous, thorax at middle broadly piceous; beneath black; length .06 inch.

**catalinæ**.

Testaceous; length .035 inch. . . . . **pallida**.

**C. pusilla** Lec., Proc. Acad. 1852, p. 135; *puncticollis* Lec. loc. cit.

Broadly oval and convex, a few punctures on the head and thorax, surface otherwise polished.

Two forms occur which are probably sexual :

*C. puncticollis* is entirely black, the legs usually piceous or black.

*C. pusilla* has the sides of the thorax variably pale, head and legs bright yellow.

Occurs from Michigan to Georgia, westward to Nebraska and Arizona.

**C. catalinæ** n. sp.—Similar in form to *pusilla*, castaneous, middle of thorax and narrow space at base of elytra piceous, body beneath black, head and legs bright yellow. Head smooth, with a few short erect hairs. Thorax with few scattered punctures near the middle. Body beneath smooth, last ventral segment paler at middle. Length .06 inch.; 1.5 mm.

One specimen Catalina, S. Cal., sent me by Mr. H. C. Fall.

**C. pallida** Lec., Proc. Am. Philos. Soc. 1878, p. 400.

Precisely similar to *pusilla* in form and sculpture, but is very much smaller and entirely testaceous.

One specimen (cab. Lec.) Sand Point, Fla.

*Serangium maculigerum* Blackb. seems to belong to this genus. This is one of the Australian species, of which probably a few were introduced into California, but none have since been found. Specimens were sent me by Mr. Koebele.

### SCYMNUS Kug.

The only attempt at a treatment of our species of *Scymnus* was made by Dr. LeConte in 1852 (Proc. Acad. Nat. Sci.), since which time nothing has been done other than the description of three new species by Crotch and three by LeConte. In that paper twenty-seven species were recognized, while seven described previously by Mulsant and Melsheimer remained unidentified, but have since been deter-

mined with but one exception. This condition forms a good basis for the resumption of the study of the species. In the "Zoology of Eugenes Resa" Boheman has described three species—*atramentarius*, *californicus* and *infuscatus* as from San Francisco, which have not been identified, and from the well-known errors of locality in that work may be safely rejected from our faunal list, as well also *S. cyanescens* Muls., which seems to be of a style of coloration unknown in our species. *S. arcuatus* Rossi, a well-known European species appears in Crotch's "Check List" on the authority of a specimen in LeConte's cabinet the origin of which could never be ascertained. No other specimen has ever been captured, and this name may also be dropped. In the "Catalogus" a *S. floridanus* Muls. is given. This was described as, and undoubtedly is, a *Hyperaspis*. A recent examination of *S. nigripennis* Lec. shows it also to be a *Hyperaspis*.

The present attempt to study *Scymnus* is merely an endeavor to make a little advance, to separate our species with more certainty, and finally to place in the hands of students some information by means of which still better results may be obtained. The separation of the species is by no means an easy task, especially among those in which the elytra are tipped with red. *Scymnus* is one of those genera in which nominal species can be most easily separated with a paucity of material, the larger the series with the usual variations the greater the difficulty.

*Scymnus* varies in outline from broadly oval, in which the outline is practically continuous, to oblong in some cases with the thorax narrower than the elytra, thus interrupting the outline.

The surface is always pubescent, but in a variable manner among the species, as a general rule very sparsely in the species of the first two divisions. In those in which the pubescence is distinct the hairs may be arranged without order, or there may be a somewhat spiral arrangement giving the surface a holosericeous appearance. To the experienced eye this may be an aid in separating closely allied species, but from the fugitive nature of the pubescence no mention is made either of its existence or character in the descriptions which follow.

The head shows no characters of value in separating the species. It has been observed, by LeConte and Mulsant, that the head is in some species yellow in the male and piceous in the female, but this is not constant, as the head may be in either color in the two sexes. The antennæ are nearly always pale in color.

The thorax, always narrower in front, varies in form as shown in the sketches annexed. The basal marginal line is usually very distinct, rarely obliterated.

The elytra vary in outline with the form of the species, and are always confusedly punctured, from densely to very sparsely, and from coarse to very fine. In a series of moderate size the coarseness of the punctuation is a variable quantity, and species cannot be safely separated thereby. Those species in which there is color ornamentation show the usual variation of color characters, but it is remarkable that the extent of variation is so little in those species with the apex more or less red.

The epipleuræ are horizontal and without foveæ for the reception of the knees. There is, however, a partial exception in *caurinus*, a species of the third group.

The prosternum exhibits two modifications which are not so sharply defined as to enable the characters to be used for systematic purposes with certainty. In the species of the first two groups the prosternum is either flat or slightly convex without the ridges, while in the next two groups there is on each side a finely elevated line usually the entire length of the prosternum, the two convergent in front.

The metasternum is usually smoother at middle than at the sides. On each side behind the middle coxæ there will be observed an elevated curved line beginning at the inner edge of the meso-coxal cavity curving backward and outward joining the suture between the metasternum and its episternum. In the first two groups this juncture occurs posteriorly to the anterior third of the suture, while in the next two groups the arc is more nearly complete the line joining the suture near the front, very often at the angle.

The abdomen is said to be composed of five segments, but in the first two groups there are six very distinct segments in both sexes, while in the next two groups the occurrence of the sixth segment is not frequently observed. Fearing that I had only females of the first two groups for examination I directed the attention of Mr. H. C. Fall, of Pomona, Cal., to the species which he might observe and from specimens collected in coitu it has been found that the sexes are alike in the number of segments and the male has no apical impression. The suture separating the first two ventral segments varies greatly in distinctness, being at times nearly obliterated at middle and sometimes as distinct at middle as at the sides. Mr. Blackburne (Trans. Royal Soc. South Aust. xv, 1892) restricts the

name *Scymnus* for those with the suture feeble at middle and proposes *Scymnoides* for those with the distinct suture. This character fails to have any value in our series of species.

The first ventral segment exhibits the character of greatest value in the division of the species in groups. Posteriorly to the coxal cavity is a slightly elevated line beginning at the inner edge of the cavity passing more or less obliquely and curved toward the first suture sometimes joining the suture and continuous with it, or running parallel with the suture or recurving to the front and when entire ending near the anterior angle of the segment. By some authors the area enclosed by this line is spoken of as the "abdominal plate," but in the present essay the more definite term "metacoxal line" has been adopted. In the species of the last two groups in this essay Dr. LeConte always mentioned the sculpture of the abdominal plates, but there has been observed a lack of constancy within specific limits and too little variation between the species to render the description valuable. As a rule, in the first two groups the area is finely punctured, or exactly as the rest of the superficial area, while in the last two groups the anterior portion is coarsely punctured and the posterior comparatively smooth.

The claws vary in form between the species and sometimes between the sexes. In some of the smaller forms of the first two groups the claws are simply dilated at base or feebly toothed. In the other species the claws are provided with an appendix sometimes of such length as to make the claw appear cleft, in these the female has a shorter appendix. Some interesting notes on this character among the species collected by him have been made by Mr. H. C. Fall, but beyond their mention in a general way I have not been able to utilize them.

The secondary sexual characters are not, as a rule, conspicuous. In the first two groups I have not observed any sexual differences. In the next two groups the fifth ventral of the male is impresso-emarginate in a not greatly varying degree. Occasionally the sixth segment is apparent when the impression is somewhat cupuliform. In the form considered *marginicollis* the male has on the first segment a small tubercle at middle near the suture with very short hair, while in *puncticollis* the male has a median smooth area, on each side of which is a narrow pubescent region. In *cervicalis* the males are very evidently less broadly oval than the females.

Color characters have their utility in the separation of species of *Scymnus*, but some care and no little experience is required in their use. In *guttulatus* the elytra may become almost entirely yellow, while in *nebulosus* the small black spots may be so numerous and large that the elytra appear almost entirely black. The legs vary in color. As a general rule the species of the first two groups have pale legs. In other species two colors exist—piceous and red. The former color will vary to testaceous, while the latter may become dark brown. It seems to me that too strict an insistence on the color of the legs as of specific value is not advisable from the known tendency to variation.

From the characters given in the preceding remarks and the comments upon them it is evident that primary groups based on the form of the metacoxal line afford the most natural arrangement of the species.

Metacoxal line incomplete.

Metacoxal line joining the first ventral suture.....Group A.

Metacoxal line parallel with the first suture.....Group B.

Metacoxal line recurved at end.....Group C.

Metacoxal line forming an entire arc beginning at the inner border of the coxal cavity, varying in the degree of its curve, ending at or near the front angle of the first segment. .... **Group D.**

Group A.

In this group the metacoxal line passes in an oblique curve from the inner edge of the posterior coxal cavity and joins the suture, becoming evanescent. The species are all of small size, the elytra in the majority being ornate with spots or bands. The prosternum is without elevated lines, or at most exhibits very faint traces of them. The metacoxal arc forms a very open curve joining the met-episternal suture near its middle. The abdomen has six distinct segments in both sexes.

The species may be separated as follows:

Elytra piceous, variably ornate.....2.

Elytra yellowish testaceous..... 7.

2.—A post basal, slightly oblique yellow band on each elytron....**balteatus.**

Elytra with one or two spots on each.....3.

Elytra narrowly tipped with yellow.....6.

3.—One spot on each elytron, slightly in front of middle....**bigemmeus** ♂.

One spot on each elytron often joined to a large pale apical area.

**bigemmus** ♀.

Two spots on each elytron.....4.



4.—Head and thorax yellow, the latter sometimes with piceous basal spot.

**Liebecki.**

Head and thorax black.....5.

5.—Form oval, elytral spots small and oval.....**myrmidon.**

Slightly oblong, spots somewhat transverse.....**quadriteniatus.**

6. Thorax entirely yellow, elytra very narrowly yellow at tip.....**xanthaspis.**

Thorax yellow at sides, elytra with a large yellow spot at apex.

**terminatus.**

**femoralis.**

7.—Thorax smooth, elytra sparsely punctate.....**debilis.**

The species of this group are from the Atlantic region, except *debilis* from California, but specimens have occurred in Florida which I cannot at present separate from it.

**S. balteatus** Lec.—Oblong, nearly a half longer than wide, head and thorax reddish, elytra piceous, with a rather broad, slightly oblique yellow band in front of middle, touching the side, but not crossing the suture. Head scarcely visibly punctate. Thorax narrow in front, sides moderately arcuate, surface very sparsely, finely punctate, a fine basal marginal line. Elytra distinctly, not closely punctate; prosternal plate flat, wider in front; meso- and metasternum reddish, the latter scarcely punctate, mesocoxal line joining the suture nearly at its middle. Abdomen piceous, sparsely punctate, with six distinct segments; metacoxal line joining the first suture. Legs yellow. Length .06 inch.; 1.5 mm. Pl. I, fig. 5.

This species may be at once known by its oblong form and the band-like marking.

Dr. LeConte uses the expression "post-coxal arcs entire," but this is an error of observation caused by a smoother oblique space dividing the meta-coxal plate, and when in certain lights the arc seems complete.

Haulover and Sand Point, Fla.

**S. bigemmus** n. sp.—Oval, the margin very nearly continuous, head yellow, thorax piceo-testaceous, paler at the sides; elytra black, with a small yellow spot on each slightly in front of the middle, apex narrowly pale. Head and thorax scarcely visibly punctate, the latter slightly narrowed in front, sides distinctly arcuate, the basal marginal line scarcely visible. Elytra sparsely and indistinctly punctate; prosternum punctate, not distinctly margined at the sides; metasternum at sides almost smooth, the mesocoxal line joining the suture near the middle. Abdomen yellow, sparsely punctate, metacoxal line joining the suture. Legs yellow. Length .05 inch.; 1.25 mm. Pl. I, fig. 3.

Since the description was written from the unique male in my collection I have seen several females in the collection of Hubbard and Schwarz. These have the thorax entirely yellow, and in addition there is a large yellow area around the apex which is sometimes joined to the discal spot. The sketch of the female (Pl. I, fig. 4) gives on each elytron the variations.

This is one of our smallest species. It is known by the single spot on each elytron a little in front of middle. There are six ventral segments.

*Hab.*—Florida, Punta Gorda and Biscayne Bay.

**S. Liebecki** n. sp.—Oval, convex, a slight entering angle at base of thorax, head and thorax yellow, the latter darker in front of scutellum, elytra piceous, a narrow, apical, pale border, a small round yellow spot in front of middle nearer the suture than side, a slightly sinuous transverse band one-third from apex touching the side, but not the suture. Head scarcely punctate. Thorax distinctly punctate, not closely nor coarsely, a fine basal marginal line. Elytra moderately, coarsely and closely punctate; prosternal plate slightly narrowed in front, with feebly indicated, lateral, elevated lines; metasternum closely punctate at the sides, the mesocoxal line joining the suture at a right angle near its middle. Abdomen reddish yellow, punctate; metacoxal line joining the suture and continuous with it. Legs yellow. Length .05—.06 inch.; 1.25—1.5 mm. Pl. I, fig. 6.

The abdomen has six distinct segments. At first glance this species resembles *coloradensis*, but in that species the anterior elytral spot is larger, the posterior differently formed, and the metacoxal line is distant from the suture.

*Hab.*—Southern New Jersey, collected by Mr. Charles Liebeck, whose name I have pleasure in giving to the species.

Specimens very recently examined from Elkhart, Ind., have a well-marked, thoracic, piceous spot. The posterior elytral spot is also oval and not transverse, the markings thus resembling *myrmidon*.

**S. myrmidon** Muls.—Oval, black, shining, each elytron with two sharply-defined yellow spots, placed one-third from base and one-third from apex, nearer the suture than the side, apical border very narrowly and indistinctly pale. Head brown, or paler, sparsely finely punctate. Thorax narrower in front, sides moderately arcuate, sparsely finely punctate, a little more closely near the base, a fine basal marginal line. Elytra much more coarsely punctate, not closely but equally. Prosternal plate smooth, triangular; metasternum at sides sparsely punctate, mesocoxal line joining the suture one-third from the front. Abdomen rather sparsely punctate, shining, the metacoxal line joins the first suture and runs coincident with it; femora piceous, tibiae and tarsi yellow. Length .06—.08 inch.; 1.5—2 mm. Pl. I, fig. 9.

The abdomen is brownish, paler toward apex or yellow, composed of six distinct segments, the first suture less distinct at middle.

*Hab.*—Pennsylvania, Maryland.

**S. quadritæniatus** Lec.—Oblong, fully one-third longer than wide, piceous, head and side of thorax yellow, each elytron with two yellow spots, the anterior larger, oblique and oval, the posterior reniform and transverse. Head scarcely punctate. Thorax slightly narrower in front, sides moderately arcuate, surface moderately closely punctate, especially at the sides. Elytra more sparsely

punctate than the thorax; prosternal plate narrower in front with a slight elevated line each side; metasternum sparsely punctured at the sides, the mesocoxal line joining the suture near middle of its length. Abdomen piceous, paler at apex, composed of six segments; metacoxal line joining the first suture. Legs yellow. Length .06 inch.; 1.5 mm. Pl. I, fig. 1.

Resembles *myrmidon*, but more oblong, less punctate and with sides of thorax yellow.

LeConte notes a variety in which the spots are confluent.

*Hab.*—Enterprise, Capron and Biscayne, Fla.; Opelousas, La.

**S. xanthaspis** Muls.—Oval, very little longer than wide, outline of margin nearly continuous, piceous; head, thorax, scutellum and narrow apical elytral border yellow. Head sparsely finely punctate. Thorax narrower at apex, sides feebly arcuate, surface sparsely finely punctate, basal marginal line feeble; punctures of elytra not deep nor closely placed; scutellum often yellow; prosternum much narrowed at middle, punctate, not margined; metasternum piceous, not closely punctate at the sides, mesocoxal line arcuate, joining the suture one-third from the front. Abdomen yellow, punctures fine and not close, metacoxal line joining the first suture. Legs yellow. Length .06—.07 inch.; 1.5—2 mm. nearly.

The abdomen has six segments, the terminal very short. This species resembles *cervicalis*, but is smaller, and has differently formed coxal arcs.

Among the species unknown to LeConte (Proc. Acad. 1852, p. 141) this was placed as a synonym of *ochroderus*, which is now considered merely a variety of *thoracicus*. The "Catalogus" erroneously places *xanthaspis* as a variety of *terminatus*.

*Hab.*—Georgia, Florida and Texas.

**S. terminatus** Say.—Oval, very little longer than wide, margin nearly continuous, piceous; head, margin of thorax and elytral apex yellow. Head sparsely punctate. Thorax distinctly narrower in front, sides moderately arcuate, disc moderately closely punctate, more closely near the sides. Elytra a little more coarsely, but less closely punctured than the thorax; prosternum narrow, an elevated line each side; metasternum closely punctate at the sides, the mesocoxal line joining the suture one-third from the front. Abdomen yellow, piceous at base, the metacoxal line joining the suture and continuous with it. Legs yellow. Length .06—.075 inch.; 1.5—2 mm. nearly. Pl. I, fig. 15.

The abdomen has six distinct segments. The yellow apical region of the elytra occupies about a fifth or fourth along the suture. The abdomen may be almost entirely yellow, frequently the two basal joints are dark. The pale margin of the thorax varies in extent, and may continue along the apex.

*Hab.*—Pennsylvania, New Jersey, North Carolina, Georgia, Texas.

**S. femoralis** Lec.

This species resembles *terminatus* so closely that it may probably be considered a variety. The unique, on which it is founded, has the thorax at sides and in front more narrowly bordered with yellow than in *terminatus*. The abdomen is entirely black, but the color varies considerably in *terminatus*. LeConte seems to have considered the color of the legs important, but I do not find the thighs black as he states, the color seeming to be merely a very dark red, as if discolored by grease.

*Hab.*—Pennsylvania. Specimen unique.

***S. debilis*** Lec.—Oval, margin slightly interrupted at humeri, about a fourth longer than wide, form not very convex, entirely yellowish testaceous. Head and thorax very sparsely punctate, the latter slightly narrowed in front, sides feebly arcuate. Elytra sparsely, obsoletely punctate; prosternum narrower in front, a slight elevated line each side; metasternum sparsely punctulate, the mesocoxal line arcuate, joining the suture near the apex. Abdomen sparsely punctate, the metacoxal line joining the first suture and continuous with it. Length .04—.05 inch.: 1—1.25 mm.

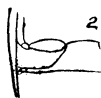
The abdomen has six very distinct ventral segments.

Owing to the fact that the condition of the unique type did not permit a proper examination, this species was placed among those in which the ventral arc is entire.

*Hab.*—California, San José and Alameda. I have also specimens from Marquette, Mich., and Florida, which I am unable at present to separate from those from California.

Group B.

The metacoxal line passes obliquely toward the first ventral suture and with a gradual or abrupt bend continues parallel with the suture.



The prosternum is convex or flat, with only mere traces of the elevated lines. The mesocoxal arc is rather open and joins the met-episternal suture near the middle.

The species may be arranged in the following manner:

- Elytra entirely piceo-testaceous or ferruginous.....**intrusus.**  
Elytra piceous, maculate.....2.  
2.—Each elytron with one spot.....3.  
    Each elytron with two spots.....4.  
3.—Thorax yellow, elytral spot large and slightly post-median..**bivulnerus.**  
    Thorax black.  
        Legs ferruginous, elytral spot one-third from apex and ill-defined.  
**bisignatus.**  
Femora piceous, tibiae and tarsi yellow, elytral spot well defined, post-  
    median.....**flavifrons.**  
Thorax brown, elytral spot large and gradually suffused.....**sordidus.**

4.—Form decidedly elliptical, body beneath black, legs ferruginous. **ornatus**.

Form broadly oval.

Head and thorax yellow, posterior elytral spot somewhat triangular, abdomen black.....**coloradensis**.

Head and thorax at sides yellow, posterior elytral spot very irregular, tip pale; abdomen piceous.....**amabilis**.

Head black, anterior angles of thorax sometimes yellow, posterior elytral spot transverse, sometimes divided; abdomen black...**guttulatus**.

Of the above species six are from the Atlantic region and three from California.

**S. intrusus** n. sp.—Oval, very little longer than wide, margin continuous, moderately convex, ferruginous. Head sparsely punctate. Thorax narrower in front, sides feebly arcuate, disc sparsely indistinctly punctate, basal marginal line indistinct. Elytra moderately coarsely, not closely punctate, smoother near apex; margins of prosternum slightly elevated between the coxæ; metasternum closely punctate at the sides, the mesocoxal arc joining the suture one-third from apex. Abdomen punctate at the sides, the metacoxal line parallel with the suture, but not reaching the side margin. Length .06—.67 inch.; 1.5—2 mm. nearly.

The abdomen has six distinct segments. Resembles *debilis*, but is more evenly oval and more convex. The form of the metacoxal line will readily separate the two.

*Hab.*—Maryland, North Carolina, Texas, Arkansas, Missouri.

**S. bivulnerus** n. sp.—Regularly oval, sides of thorax and elytra continuous, piceous, head and thorax and a moderately large oval spot slightly post-median on each elytron, yellow. Head and thorax sparsely, finely punctate, a scarcely distinct basal marginal line. Elytra moderately closely punctate; prosternum rather coarsely punctate, without marginal line; metasternum at sides not closely punctate, mesocoxal line arcuate, joining the lateral suture a short distance from the front. Abdomen reddish, moderately densely punctate, metacoxal line parallel with the first suture. Legs yellow. Length .06 inch.; 1.5 mm. Pl. I, fig. 10.

The abdomen has six distinct segments.

*Hab.*—Florida, Biscayne and Key West (Schwarz).

**S. bisignatus** n. sp.—Oval, margin slightly interrupted at the base of the thorax, black, moderately shining, each elytron with a transversely oval red spot behind the middle. Head very indistinctly punctate. Thorax slightly narrower in front, sides feebly arcuate, surface very sparsely finely punctate, basal marginal line very fine. Elytra coarsely not closely punctate; prosternal plate broader in front, coarsely punctured, slightly margined at the sides; metasternum coarsely punctured at the sides, the mesocoxal line arcuate joining the suture near the front. Abdomen rather sparsely punctate, the metacoxal line distant from the suture and slightly arcuate, not parallel with the suture. Legs reddish. Length .08 inch.; 2 mm. Pl. I, fig. 11.

This species resembles *bioculatus*, but the reddish elytral spot is larger and less sharply defined. In the form of the metacoxal line

the present species approaches the form seen in the *americanus* group. The abdomen has six distinct segments.

*Hab.*—Siskiyou County, Cal. (Koebele, 39).

**S. flavifrons** Mels.—Oval, black, an oval yellow spot on each elytron one-third from apex equally distant from side and suture, head often, tibiae and tarsi always yellow. Head sparsely punctate. Thorax narrower in front, sides moderately arcuate, surface sparsely punctate, a fine basal marginal line. Elytra more coarsely, but less closely punctate than the thorax. Body beneath black; metasternum nearly smooth at middle, closely punctate at the sides; mesocoxal line joins the episternal suture one-third from the front. Abdomen moderately coarsely and closely punctate; metacoxal line parallel with the first ventral suture. Length .06—.08 inch.; 1.5–2 mm. Pl. I, fig. 7.

Two fairly well marked varieties occur in this species:

*S. flavifrons* Mels. with a yellow head; subvarieties occur with the thorax entirely black, or with the side margin yellow, sometimes extending along the apex. Specimens occur with only the front angles yellow.

*S. bioculatus* Muls.—This has a black head and thorax. Mulsant indicates three varieties of this. One is the typical form with the spot of moderate size, the second has a very small spot (*guttiger*) the third has the spot much extended, and in addition has an apical pale border (*marginellus*). This latter is to me doubtfully from our fauna, and seems to be a distinct species.

All the specimens examined seem to be females. The abdomen is very plainly composed of six segments, and the suture between the first and second well marked in its entire extent.

*Hab.*—Canada, Pennsylvania, New Jersey, Ohio, Illinois, Georgia.

**S. sordidus** n. sp.—Oval, outline regular, about a fourth longer than wide, normal color piceous, each elytron with a large paler spot, which leaves only a narrow border at sides, base and suture darker, sometimes entirely ferruginous. Head and thorax scarcely punctate, the latter narrower in front, with feebly arcuate sides, the basal marginal line indistinct. Elytra moderately closely punctate; prosternum convex, coarsely punctate, not margined at the sides; metasternum coarsely punctured at the sides, the mesocoxal line arcuate, joining the suture near the middle. Abdomen moderately closely punctate, the metacoxal line not joining the first suture. Legs yellow. Length .06—.08 inch.; 1.5–2 mm. Pl. I, fig. 16.

In color this species varies from ferruginous to piceous, in the latter case the large pale space on the elytra is defined, but not sharply. The abdomen has six segments.

*Hab.*—California, Los Angeles and Owens Valley.

**S. ornatus** Lec.—Elliptical, black, dull, each elytron with two obliquely oval and moderately large orange-yellow spots, legs reddish, femora often darker. Head rather sparsely and finely punctured. Thorax narrowed in front, sides feebly arcuate, surface finely, sparsely and equally punctulate, a fine basal marginal line. Elytra more coarsely punctate than the thorax; metasternum coarsely punctured at the sides, the mesocoxal line joining the suture one-third from the coxa. Abdomen coarsely not closely punctate, metacoxal line not touching the first ventral suture and turned slightly forward at its outer end. Length .08—.09 inch.; 2 mm. more and less. Pl. I, fig. 12.

The elytral spots are not very strongly defined. The anterior is oval and oblique, the posterior more transverse, the two spots may touch.

The abdomen in the only specimen before me, a female, is composed of six distinct segments, the first suture distinct in its entire extent.

*Hab.*—Lake Superior region and Massachusetts.

**S. coloradensis** n. sp.—Oval, thorax slightly coarctate at base, head and thorax yellow, the latter darker at middle of base, elytra piceous, on each a slightly oblique rhomboidal spot one-third from base, a triangular spot emarginate in front, one-third from apex. Head very sparsely punctate. Thorax scarcely narrowed in front, sides feebly arcuate, surface sparsely punctate, a fine basal marginal line. Elytra much more distinctly punctate, but not closely; prosternal plate rather broad, flat, coarsely punctured; metasternum coarsely punctured at the sides, the mesocoxal line arched joining the suture one-third from the apex. Abdomen piceous, not closely punctate, metacoxal line not joining the suture, but parallel with it. Legs yellow. Length .06 inch.; 1.5 mm. Pl. I, fig. 2.

I have seen but one specimen of this species. The elytral markings resemble some of the varieties of *guttulatus*, but the present species has a yellow head and thorax. There are six distinct ventral segments.

*Hab.*—Garland, Col. (Schwarz).

**S. amabilis** Lec.—Oval, not very convex, piceous, or almost black; head, sides and apex of thorax yellow, elytra with an anterior, oblique, irregular fascia, composed of two spots united by a narrow isthmus, apex yellow, curving inward one-third from apex forming a lunule, inside of which is an irregular spot. Head almost smooth. Thorax scarcely narrower in front, sides feebly arcuate, surface finely sparsely punctate, a fine basal marginal line. Elytra moderately coarsely, not closely punctate; prosternal plate parallel, margined at the sides, punctate at middle; metasternum closely punctate at the sides, mesocoxal line joining the suture nearly at middle. Abdomen piceous, paler at sides and apex, composed of six segments, the terminal not prominent; metacoxal plate shorter than the segment, the line curved slightly forward at its outer end. Legs yellow. Length .06—.08 inch.; 1.5–2 mm. Pl. I, fig. 8.

The markings of the elytra are not greatly variable, although at times broadened; they, however, preserve the type above described.


*Hab.*—Louisiana.

**S. guttulatus** Lec.—Oval, sides of thorax and elytra nearly continuous black, each elytron with an anterior oblique spot composed of two, which may be joined or separate; at posterior third a transverse band not touching the side or suture, apex indefinitely paler. Head and thorax sparsely and very finely punctate, the thorax with fine basal marginal line; prosternum punctate, without marginal line; metasternum closely punctate at the sides, the mesocoxal line joining the lateral suture one-third from the coxa. Abdomen moderately closely punctate, the metacoxal line curving outwardly not joining the suture, but parallel with it. Legs piceous. Length .06—.08 inch.; 1.5—2 mm. Pl. I, figs. 13, 14.

This species varies in the extent of its elytral markings. The head may be yellow, and also the anterior angles of the thorax. The abdomen has six distinct segments.

*Hab.*—California, Alameda County, and the vicinity of San Francisco.

#### Group C.

The metacoxal line in the species of this group passes in an oblique curve toward the first suture and then gradually curves forward, but is not complete. The mesocoxal arc curves forward and joins the suture near the front angle of the met-  

 episternum. The prosternal elevated lines are usually entire and distinct. The abdomen has but five segments, but in some females a sixth is visible. The species are not numerous, and may be thus separated:

Elytra yellowish testaceous.

With numerous small black spots.....**nebulosus.**

Without spots.....**Phelpsii.**

Elytra black, with ante-median obliquely oval red spot.....**circumspectus.**

Elytra black, with large, apical, pale area.....**opaculus.**

Elytra entirely black.

Abdomen more or less yellow, prosternal lines entire.....**americanus.**

Abdomen black, prosternal lines short.....**caurinus.**

**S. nebulosus** Lec.—Oval, outline nearly continuous, about one-fourth longer than wide, moderately convex, above pale rufo-testaceous, the elytra with small, irregularly placed spots, body beneath black. Head sparsely punctate. Thorax slightly narrower in front, very sparsely finely punctate, basal marginal line nearly obsolete. Elytra moderately coarsely, not closely punctate; prosternum narrowed in front, each side with an elevated line; metasternum closely punctate at the sides, the mesocoxal line forming a nearly complete arc. Abdomen sparsely punctate, the metacoxal line arched, distant from the first suture, incomplete externally. Legs testaceous, femora sometimes darker. Length .07—.09 inch.; 2—2.25 mm.

In the males the fifth ventral is broadly, but slightly emarginate; in the females a sixth segment is very distinctly visible.

In some specimens the disc of the thorax is clouded with piceous.

*Hab.*—California, Alameda County and Colorado River.



**S. Phelpsii** Crotch.—Oval, outline nearly continuous, very little longer than wide, moderately convex, rufo-testaceous, underside never entirely black. Head and thorax sparsely punctate, the latter narrower in front, sides feebly arcuate, basal marginal line indistinct. Elytra moderately, not closely punctate, the punctures coarser and finer intermixed; prosternum narrower in front, a fine elevated line each side; metasternum closely punctate at sides, mesocoxal line curved, joining the suture behind the apex. Abdomen less closely punctate, the metacoxal line arcuate close to the suture, incomplete externally. Legs rufo-testaceous. Length .08 inch.; 2 mm.

The mesosternum is always piceous, the abdomen may be piceous, except at apex, or may be entirely pale.

This species resembles *nebulosus*, but the two differ in the metacoxal arc. Here it approaches within a fifth of the length of the segment to the first suture, and in *nebulosus* is one-third from the suture. The abdomen is similarly formed in the two species.

*Hab.*—British Columbia, Oregon, northern California and Nev.

**S. circumspectus** n. sp.—Broadly oval, convex, black, each elytron with an oval orange spot, in front of middle, placed slightly obliquely, the outerside truncate. Head moderately closely punctate. Thorax narrowed in front, sides moderately arcuate, disc rather closely not coarsely punctate, basal marginal line distinct. Elytra rather coarsely punctate, closely but not densely; prosternum punctate, with elevated, convergent lines; metasternum closely punctate at the sides, mesocoxal line arcuate, joining the suture near the front. Abdomen closely punctate, metacoxal line arcuate, not reaching the suture, incomplete externally: femora piceous, tibiae and tarsi yellow. Length .10 inch.; 2.5 mm. Pl. II, fig. 4.

The abdomen has five segments. This species is easily known, being the only one in our fauna with the incomplete, but arcuate metacoxal line having an elytral spot.

*Hab.*—Lookout Mountain, Tenn., Louisiana (Ulke).

**S. opaculus** n. sp.—Oval, convex, very little longer than wide, margin continuous, piceous, head and sides of thorax broadly yellow, elytra with an apical pale space occupying a fourth, the anterior edge on each side convex in front. Head sparsely punctate. Thorax narrower in front, sides arcuate, disc sparsely finely punctate, basal marginal line indistinct. Elytra moderately closely and more coarsely punctate than the thorax: prosternum punctate, the lateral elevated lines indistinct; metasternum coarsely and closely punctate at the sides, the mesocoxal line joining the suture a little in front of the middle. Abdomen yellow at sides and apex, composed of five segments, closely punctate, the metacoxal line touches the suture and curves feebly forward. Legs yellow. Length .10 inch.; 2.5 mm.

This species has considerable superficial resemblance to *Brullei*, but is darker, differing especially in the form of the metacoxal line, which is a complete arc in *Brullei*. There is a distinct epipleural fovea for the reception of the knee of the middle leg.

One specimen, Colorado.

**S. americanus** Muls.—Broadly oval, convex, color variable, thorax usually orange with a central piceous space, elytra narrowly tipped with red. Head and thorax sparsely punctate, the latter narrowed in front with feebly arcuate sides, basal marginal line distinct. Elytra coarsely and moderately closely punctate; prosternum with convergent elevated lines, which are variable in distinctness; metasternum rather coarsely and closely punctate at the sides, the mesocoxal line arched, joining the suture near the front. Abdomen more or less yellow, moderately closely punctate, the metacoxal line arcuate, approaching very close to the first suture. Legs usually yellow, but varying to black. Length .08—.12 inch.; 2—2.5 mm.

The abdomen has but five segments, the last two of the male feebly broadly emarginate. Usually the head is yellow, specimens are not rare black. The thorax may be almost entirely yellow, usually with a median piceous space; sometimes the angles only are yellow, while several specimens before me are entirely black. The abdomen is usually yellow, piceous at middle and base, but the entire color may be black. The legs vary from yellow to black.

*Hab.*—New York southward to Florida and Texas, westward to Illinois.

**S. caurinus** n. sp.—Broadly oval, convex, outline continuous, entirely piceous, sometimes with the head and sides of thorax yellow. Head sparsely punctate. Thorax narrower in front, sides feebly arcuate, very finely sparsely punctate, basal marginal line not visible. Elytra moderately coarsely, not closely punctate, the lateral elevated lines short: metasternum at sides closely, roughly punctate, the mesocoxal line joining the suture one-third from the front. Abdomen black, with five segments, closely punctate, the metacoxal line very nearly touching the suture, curving to front and evanescent. Legs red. Length .08—.10 inch.; 2—2.5 mm.

This species varies from entirely piceous to those having the head and a variable extent of the sides of the thorax reddish yellow. The entirely black forms resemble *tenebrosus*, but differ in the form of the metacoxal arc.

*Hab.*—Washington, Oregon (Koebele) and Cal. (Owens Valley).

#### Group D.

The metacoxal line in this series forms a complete arc beginning at the inner edge of the posterior coxal cavity, sometimes touching at the apex of the curve the first suture, ending nearly at the anterior angle of the segment. The prosternal lines are well marked and entire in all the species, usually convergent to the front. The mesocoxal arc joins the met-episternal suture near the front angle. The abdomen has five segments, but rarely specimens show the sixth.



The species of this group nearly equal in number those of all the preceding groups together, and present the greatest difficulty in their separation. The greater number of the species had been described from very limited material, and the characters made use of are now seen with more specimens and species to have very little value. On the other hand it has never been found necessary to use the secondary sexual characters for the first time.

The following table will assist in the separation of the species :

- |  |                       |
|--|-----------------------|
| Form broadly oval, outline at humeri continuous.....   | 2.                    |
| Form oblong, thorax narrower at base than the base of elytra.....                                  | 12.                   |
| 2.—Entirely testaceous above.....  | <b>pallens.</b>       |
| Elytra in great part yellow, with merely an elongate-triangular sutural area black.....            | <b>cinctus.</b>       |
| Elytra black, with discal defined spot.....  | 3.                    |
| Elytra pale at apex, either merely bordered with yellow, or with an apical area of that color..... | 4.                    |
| Elytra entirely black.....   | 7.                    |
| 3.—Elytral spot antemedian, nearly oval, anterior angles of thorax yellow.                         | <b>pacificus.</b>     |
| Elytral spot very oblique, thorax black.....   | <b>strabus.</b>       |
| Elytral spot post-median, thorax yellow at sides.....  | <b>flebilis.</b>      |
| 4.—Elytral pale apex wide, or even large.....  | 5.                    |
| Elytra narrowly pale at apex.....  | 6.                    |
| 5.—Thorax with median black spot.  |                       |
| Apical spot not larger than a fifth the length of the suture.....                                  | <b>fraternus.</b>     |
| Apical spot fully a third of superficial area.....   | <b>Brullei.</b>       |
| Thorax entirely yellow.  |                       |
| Apical area large.....   | <b>semiruber.</b>     |
| 6.—Thorax partly black.  |                       |
| First ventral of male with a median smooth area surrounded by short pubescence.....                | <b>puncticollis.</b>  |
| First ventral of male without pubescence.....  | <b>collaris.</b>      |
| Thorax entirely yellow.....  | <b>cervicalis.</b>    |
| 7.—Species larger .08—.10 inch.....  | 8.                    |
| Species small .06 inch.....  | 11.                   |
| 8.—Metacoxal arc much shorter than first segment.....  | <b>abbreviatus.</b>   |
| Metacoxal arc nearly as long as the segment.....   | 9.                    |
| 9.—First ventral of male with a tubercle at middle of posterior edge, finely pubescent.....        | <b>marginicollis.</b> |
| First ventral male not tuberculate.....  | 10.                   |
| 10.—Last segment of male feebly impresso-emarginate.   |                       |
| Sides of thorax more or less yellow.....   | <b>ardelio.</b>       |
| Thorax entirely black.....   | <b>tenebrosus.</b>    |
| Last segment of males deeply impresso-emarginate.....  | <b>lacustris.</b>     |
| 11.—Metacoxal arc scarcely as long as half the segment.....  | <b>punctum.</b>       |
| Metacoxal arc nearly as long as the segment.   |                       |
| Thorax distinctly punctate; pubescence recumbent.....  | <b>nanus.</b>         |
| Thorax smooth; pubescence erect.....   | <b>utilis.</b>        |

- 12.—Elytra relatively coarsely punctured, black with a spot of variable size nearly central on each elytron, rarely absent.....**punctatus.**  
 Elytra very indistinctly punctate, almost entirely reddish yellow, base and suture alone dark .....**coniferarum.**

**S. pallens** Lec.—Rather broadly oval, margin slightly interrupted, convex, rufo-testaceous above, beneath black, except the last three segments of abdomen, legs pale. Head very sparsely punctate. Thorax narrower in front, sides arcuate, surface finely evenly punctate, basal marginal line distinct. Elytra moderately, finely and not deeply punctate; prosternum punctate, the elevated lines short, posterior; metasternum at sides coarsely, closely punctate, mesocoxal line arcuate, joining the suture near the front. Abdomen coarsely and closely punctate, the metacoxal line forming a complete arc very nearly as long as the first segment. Length .06—.08 inch.; 1.5—2 mm.

The abdomen has five segments only. This species resembles *Phelpsii*, which, however, has an incomplete metacoxal arc. The first two ventral segments and the middle of the third are black, the rest of the abdomen yellow.

*Hab.*—California, San Francisco, Alameda, Los Angeles, Yuma. American Fork Canon, Utah, Pinal Mountains, Ariz.

**S. cinctus** Lec.—Broadly oval, convex, outline continuous, beneath piceous, above in great part reddish yellow, the thorax with a basal piceous spot, which continues on the elytra gradually narrowing, reaching more than three-fourths the length of the suture. Head not densely punctate. Thorax narrower in front, sides feebly arcuate, basal marginal line distinct, surface finely and equally punctate. Elytra much more coarsely and deeply punctured than the thorax; prosternum punctate, the elevated lines convergent to the front; metasternum at sides coarsely and closely punctate, the mesocoxal line arcuate, joining the suture near the front. Abdomen closely punctate, the metacoxal line entire not quite reaching the margin of the segment, the outer end reaching the anterior angle of the segment; femora piceous, tibiae and tarsi paler. Length .08 inch. slightly more or less; 2 mm. Pl. II, fig. 5.

Under the above name *suturalis* || Lec. (*LeContei* Cr.) is included. These two species were described from uniques, and the slight differences indicated vanish in a small series. As a rule, however, the California specimens are somewhat more densely punctured, but not less coarsely as stated by LeConte.

In nearly all the specimens examined there is a short, narrow, piceous space at the side margin of the elytra slightly behind the middle. Thirteen specimens examined.

The species is very close to *Loewii* and *floralis*, and the differences noted by LeConte are as to the first of the most evanescent character, and as to the second refer rather to a variety mentioned by Mulsant.

*Hab.*—New Orleans, Texas, westward to California, Yuma to Los Angeles.

**S. pacificus** Cr.—Oval, outline nearly continuous, black shining, each elytron with a large reddish yellow oval spot slightly in front of middle, anterior angle of thorax yellow. Head sparsely punctate, color either yellow or piceous. Thorax slightly narrowed in front, sides feebly arcuate, sparsely finely punctate, basal marginal line distinct. Elytra moderately coarsely, not closely punctate; prosternum smooth at middle, the elevated lines parallel and entire; metasternum roughly punctured at the sides, the mesocoxal line arcuate, joining the suture one-third from the front. Abdomen moderately, coarsely and closely punctate, the metacoxal line forming a complete arc as long as the first segment; femora piceous, knees, tibiae and tarsi rufo-testaceous. Length .08—.10 inch.: 2—2.5 mm. Pl. II, fig. 7.

There does not appear to be any variation in the coloration of the specimens examined, except as to the head, which may be either yellow or black, independently of sex. The color of the anterior angles of the thorax is not sexual, as Crotch's description would seem to indicate.

*Hab.*—California, Calaveras to Los Angeles.

**S. strabus** n. sp.—Oval, convex, outline continuous, black, shining, each elytron with an oblique red spot, nearly all of which is in front of middle. Head sparsely punctate. Thorax slightly narrower in front, sides feebly arcuate, basal marginal line distinct, surface finely not closely punctate. Elytra sparsely, indistinctly punctate; prosternal elevated lines not reaching the anterior margin of sternum; metasternum at sides coarsely, closely punctured, the mesocoxal line arched, joining the suture one-third from apex. Abdomen closely punctate, the metacoxal line forming a complete arc, as long as the segment, the enclosed space smooth. Legs piceous, tibiae and tarsi somewhat paler. Length .10 inch.; 2.5 mm. Pl. II, fig. 6.

Of this species but one female specimen has been examined. It resembles *pacificus*, but is more convex and broader, the red spot is oblique, the thorax entirely black.

*Hab.*—New Mexico.

**S. flebilis** n. sp.—Regularly oval, black, head and sides of thorax broadly reddish yellow, each elytron with a reddish yellow triangular spot near the apex. Head sparsely punctate. Thorax narrowed in front, sides feebly arcuate, sides broadly reddish yellow, this extending narrowly along the apex, surface very sparsely punctate, the basal marginal line indistinct. Elytra moderately coarsely, not closely punctate; prosternal lines parallel and entire; metasternum coarsely punctate at sides, the mesocoxal line arcuate, joining the suture one-fourth from the front. Abdomen black, closely punctate, the metacoxal line forming a complete arc a little shorter than the segment. Legs piceous. Length .08 inch.; 2 mm.

The elytra are paler along the apical border, but without forming the red edge characteristic of the forms allied to *collaris*. To this latter species it has considerable resemblance apart from the moderately large reddish spot near the apex of the elytra, which may be called triangular with rounded angles.

*Hab.*—Arizona, Gila Bend (Wickham).

**S. fraternus** Lec.—Broadly oval. Head yellowish, sparsely punctate. Thorax narrowed in front, sides moderately arcuate, surface sparsely, obsoletely punctate, color yellow, with a piceous median area of variable extent. Elytra black, not very closely nor densely punctate, the apex with a yellowish area, which never extends along the suture more than a fifth of its length, but along the apex and sides nearly a third of the curve; prosternal lines distinct, convergent in front; metasternum coarsely punctate the mesocoxal line arcuate, joining the suture near the front. Abdomen piceous, gradually paler at sides and apex, metacoxal arc entire not quite as long as the segment. Legs reddish yellow. Length .08 inch.: 2 mm. Pl. II, fig. 3.

The only variation observed is that of color. The piceous area of the thorax may be greater or less, but the yellow lateral border is always wide. The apical pale area of the elytra does not vary to any extent. The abdomen may have the sides and apex vaguely paler, or the paler area may be well defined.

As a synonym of this species *hæmorrhous* Lec. is placed. A recent examination of the types of both shows that they were established on uniques, the differences being merely individual, *fraternus* having the greater extent of yellow on the thorax. Specimens supposed to be the males of this species are less broadly oval, and the yellow at apex of greater extent.

*S. creperus* Muls. seems to differ only in having the last three ventral segments very yellow, except a median piceous spot on the third segment. Mulsant records a variety of this which he calls *astutus*. While I am not yet fully prepared to place all the above in synonymy, it needs but a few intermediate forms to do so. In that case the name *creperus* must stand. By some accident the latter escaped notice by LeConte.

*Hab.*—Canada, Middle States, Illinois, Louisiana, Texas.

**S. Brullei** Muls.—Oval, black, sides of thorax and a large apical elytral space reddish yellow. Head sparsely punctate, color piceous or yellow. Thorax narrowed in front, sides arcuate, surface sparsely, indistinctly punctate, color variable from being entirely black to having the sides broadly and apex narrowly yellow. Elytra moderately closely and distinctly punctate, black, the apical yellow space occupying a third or even more of the superficial area; prosternal lines distinct, convergent to the front; metasternum closely punctate at the sides, mesocoxal arc joining the suture near the front. Abdomen usually entirely piceous, closely punctate, metacoxal arc entire fully three-fourths the length of the segment. Legs testaceous or slightly rufous, the femora darker. Length .08—.10 inch.; 2—2.5 mm. Pl. II, fig. 8.

The description applies to many specimens seen from Florida, Texas and Wyoming. I have two others which differ (Missouri and New York) in having the sides and apex of the abdomen broadly

yellow. The variation in color of the thorax has been indicated, that at the apex of elytra is variable in extent, rarely smaller than shown in the figure, but sometimes much larger.

A specimen in my cabinet from Texas has the elytra much more coarsely punctate than usual, the thoracic piceous area small, the sides and apex of abdomen yellow. This may indicate a distinct species, but with a unique and the recognized variation observed in other species it does not seem safe to separate it under a distinct name.

*Hab.*—Florida, Texas, Wyoming, Kansas and perhaps New York and Missouri.

**S. semiruber** n. sp.—Oval, outline regular, convex, head and thorax reddish yellow, elytra piceous, the apical third or nearly half reddish yellow, beneath piceous, abdomen almost entirely and legs yellow. Head moderately punctate. Thorax narrower in front, sides feebly arcuate, basal marginal line distinct, surface sparsely, indistinctly punctate. Elytra moderately coarsely, closely, not densely punctate; prosternum in great part yellow, the elevated lines entire and convergent; metasternum at sides coarsely and closely punctate, the mesocoxal line joining the suture one-third from the front. Abdomen closely punctate, the metacoxal arc entire, not quite reaching the first suture, the enclosed area smooth. Length .08 inch, nearly; 2 mm.

This species resembles *collaris*, but differs in the much greater extent of the red elytral apex and by the almost entirely reddish yellow abdomen. The extent of the red elytral apex is as great, or even greater than observed in *Brullei* (*hemorrhous* Lec.).

*Hab.*—Florida, Texas.

**S. puncticollis** Lec.—Oval, black, rather dull, sides of thorax indefinitely yellow, apex of elytra narrowly reddish. Head piceous, mouth paler, surface finely punctate. Thorax narrowed in front, sides feebly arcuate, basal marginal line distinct, surface evidently punctate, more closely toward the sides. Elytra more coarsely punctured than the thorax and moderately closely; prothorax beneath piceous, prosternal lines entire and nearly parallel; metathorax at sides coarsely not densely punctate, mesocoxal line joining the lateral suture near the front. Abdomen closely punctate, the metacoxal arc entire very nearly as long as the segment; tibiae and tarsi pale, femora more or less piceous. Length .08—.10 inch.; 2—2.5 mm.

The fifth ventral is broadly and deeply emarginate. The first ventral has a smooth median area limited each side by a narrow space of fine, short pubescence.

The last two or three segments are usually paler, sometimes also this color extends indistinctly on the sides of the other segments.

This species is allied by general characters to *collaris*. The head has never been observed to be yellow, nor are the sides of the thorax

as broadly so. The legs, when mature, differ in color in the two species, but immaturity in the present species would render this an indefinite character. The character shown by the first ventral segment of the male is a positive means of separation.

*Hab.*—Canada, New York and New Jersey (Da Costa, Wenzel), Upper Mississippi (LeConte).

**S. collaris** Mels.—Regularly oval, piceous, moderately shining, head and thorax reddish yellow, the latter with a piceous medio-basal area of variable extent, apex of elytra narrowly pale. Head sparsely finely punctate. Thorax narrower in front, sides feebly arcuate, surface sparsely punctate, more distinctly at middle than at sides, basal marginal line feebly distinct. Elytra punctate, the punctures not coarse nor close; prothorax beneath yellow, the prosternal lines entire, convergent in front; metasternum at sides coarsely and closely punctate, the mesocoxal line joining the lateral suture one-fourth from the front. Abdomen closely punctate, piceous, the last three segments usually yellowish, metacoxal line forming a complete arc, very nearly as long as the segment. Legs entirely reddish yellow. Length .08—.09 inch.; 2—2.25 mm. Pl. II, fig. 1.

The male has the fifth ventral broadly and deeply emarginate, the first ventral at middle finely and closely punctate, without pubescence.

The color of the thorax varies; the piceous area may be merely a small space in front of the scutellum, or it may occupy a full third of the surface. The abdomen may vary in color, so that even the sides of the first two segments may be pale. The legs seem uniformly reddish yellow.

Under the name *collaris* are included several described by Mulsant and LeConte, evidently from inadequate material; these are *chatchas* and *fastigiatus* Muls. and *caudalis*, *consobrinus* and *socer* Lec.

Closely allied also is *puncticollis* Lec., which may be separated empirically by the color of the legs, and certainly by the male characters.

*Hab.*—Canada, southward to Florida and Texas, westward to Illinois and Nebraska.

**S. cervicalis** Muls.—Oval, outline continuous, convex, head, thorax and legs reddish testaceous, elytra piceous, at apex narrowly bordered with reddish yellow. Head sparsely punctate. Thorax narrower in front, sides arcuate, surface very sparsely punctate, basal marginal line distinct. Elytra moderately coarsely, but not closely punctate; prosternum more or less yellow, the elevated lines slightly convergent to the front; metasternum at sides moderately closely punctured, the mesocoxal line joining the suture one-third from apex. Abdomen black, the terminal segments pale, metacoxal line forming a complete arc shorter than the segment. Length .06—.09 inch.; 1.5—2.25 mm.

The prosternal lines vary in length, being at times short not passing the coxæ, or they may attain the front of the prosternum. The



abdomen may be narrowly pale at apex, or the greater part of the last three segments pale. The apical pale border of the elytra is at times indistinct, in its best development it never exceeds an eighth of the length of the suture.

From an examination of the type of *socer* it seems to be an accidental *cervicalis*, with the middle third of the base of the thorax piceous.

*Hab.*—Canada, New Jersey, North Carolina, Georgia, Missouri.

**S. abbreviatus** Lec. —Oval, very little longer than broad, entirely black, legs red. Head moderately, coarsely and closely punctate. Thorax narrower in front, sides very little arcuate, basal marginal line distinct, but fine; surface sparsely punctate at middle, much more closely at the sides. Elytra coarsely and moderately closely punctate; prosternal elevated lines distinct, slightly convergent in front; metasternum closely punctate at sides, the mesocoxal arc joining the suture one-fourth from the front angle. Abdomen more finely, but densely punctate, metacoxal arc entire very little longer than half the first segment. Length .08 inch.; 2 mm.

This species resembles *tenebrosus*, but the upper surface is more coarsely and closely punctate. They differ more especially in the extent of the metacoxal arc, which here is short, but in *tenebrosus* nearly as long as the segment.

*Hab.*—Lake Superior region. Two females in the LeConte cabinet.

**S. marginicollis** Mann.—Broadly oval, outline continuous, black, head often (especially in male) and sides of thorax reddish yellow. Head finely, sparsely punctate. Thorax slightly narrowed in front, sides feebly arcuate, surface punctate, more closely at sides, basal marginal line distinct. Elytra moderately closely punctate; prosternal carinae convergent and entire; metasternum coarsely and closely punctate, the mesocoxal line arcuate, joining the suture near the front angle. Abdomen closely coarsely punctate, the metacoxal arc entire very nearly as long as the first segment. Legs nearly black, the anterior sometimes more or less rufous. Length .06—.08 inch.; 1.5—2 mm.

The male has the fifth ventral feebly emarginate as usual in the genus. At the middle of the posterior margin of the first ventral segment is a small tubercle with very small hairs.

This species varies in the coloration of the head and thorax. The head may be either red or black, in the former case nearly all are males, although some females are similarly colored. The thorax is usually yellow at the sides in a variable extent, sometimes the median dark space is reduced to a narrow strip along the middle of the base. Others again have the entire thorax black. These are not readily separable from *lacustris* by description, except in the male.

Under the name *marginicollis* there have hitherto been placed all the California *Scymnus* with black elytra and pale thoracic sides. My attention was first called to the peculiar structure of the first ventral segment of the male by Mr. H. C. Fall, of Pomona, Cal., and it is plainly evident that two species at least have been confounded. I know of no means of separating the females excepting that in the present species the legs are nearly always black, while in the other they are either red or the tibiae and tarsi are pale.

I have chosen the name *marginicollis* for the above form rather arbitrarily from the fact that it is inferrible from the descriptions that the legs are almost entirely black.

*Hab.* California, extending from a little north of San Francisco to Santa Barbara, Los Angeles; Catalina Isd., San Diego and Pomona.

**S. ardelio** n. sp.

This name is given to those forms heretofore mixed with *marginicollis*, and to which the detailed description of that will fully apply, except as to the following details:

The legs may be reddish yellow, or the tibiae and tarsi alone of that color; sometimes the legs are entirely piceo-rufous.

The male has the fifth segment feebly emarginate, the first segment at middle not tuberculate, but with an oval polished space at the suture sharply limited by the close punctures around it.

The variations are as in *marginicollis*, but specimens entirely black are more numerous, and that, too, among those with the palest legs.

It is possible that there remain two species in the above aggregate, but I am unable to separate them, but those forms with the entirely rufo-testaceous legs are to be considered the typical forms.

There is still greater difficulty in separating the species from *lacustris* and *tenebrosus* than in the case of *marginicollis*. In the latter the male has the small tubercle of the first ventral segment. In the present species the first ventral does not greatly differ from the other two mentioned. In both these, however, the last segment of the male is much more deeply emarginate, especially in *lacustris*.

*Hab.*—British Columbia southward through Washington, Oregon and California, eastward to Utah. Specimens have been seen from Arizona, El Paso, Tex., and Calmalli Mines, Penins. Cal.

**S. lacustris** Lec.—Broadly oval, convex, black. Head sparsely punctate. Thorax narrowed in front, sides feebly arcuate, surface sparsely feebly punctate. Elytra moderately, coarsely, but not closely punctate; prosternal carinae distinct,

convergent in front; metasternum at sides very coarsely punctate, the mesocoxal line joining the lateral suture one-third from the front. Abdomen black, evenly and more finely punctate than the metasternum; metacoxal arc entire, the enclosed area nearly as long as the segment; femora entirely or in great part piceous, tibiae and tarsi paler. Length .08—.10 inch.; 2—2.5 mm.

In the male the last ventral segment is very deeply impresso-emarginate. The legs may be entirely piceous.

*Hab.*—North shore of Lake Superior (Lec.); westward Utah, Park City, Nev., Washington, California.

**S. tenebrosus** Muls.—Broadly oval, entirely black, legs red or reddish brown. Head sparsely punctate. Thorax narrower in front, sides feebly arcuate, surface equally sparsely punctate. Elytra slightly more closely and coarsely punctured than the thorax. Body beneath entirely black; prosternal elevated lines entire, slightly convergent; metasternum at sides coarsely and closely punctate, the mesocoxal arc joining the lateral suture very near the front angle. Abdomen more closely, but less coarsely punctured than the metasternum, metacoxal arc entire, nearly as long as the first segment. Length .08—.10 inch.; 2—2.5 mm.

In the male the last ventral is feebly impresso-emarginate. The legs vary in color from very pale red to brown, but are uniform. In the original description LeConte states that the head of the male is pale. This is only partly true; the color of the head is by no means indicative of sex.

*Hab.*—Massachusetts to North Carolina, Southern States (Lec.).

**S. punctum** Lec.—Broadly oval, black, shining, outline nearly continuous, legs testaceous, the femora more or less piceous or even black. Head indistinctly punctate. Thorax narrowed in front, sides feebly arcuate, surface sparsely punctate at middle, more densely and coarsely at the sides, the basal marginal line distinct. Elytra sparsely punctate, the punctures finer than those of the sides of the thorax; prosternum slightly convex and punctate, without elevated lines; metasternum at sides coarsely punctate, the mesocoxal line arcuate, joining the suture one-fourth from the front. Abdomen rather densely punctate, metacoxal line forming a complete arc scarcely longer than half the first segment. Length .05—.06 inch.; 1.25—1.50 mm.

In the male the fifth ventral segment is slightly emarginate, the female has six very distinct segments. The suture between the first two ventral segments is totally obliterated at middle.

The color of the legs varies; the tibiae and tarsi are testaceous and the femora piceous, but the femora may be almost entirely pale, except at base, or may be entirely black.

*Hab.*—The species seems very widely distributed, specimens are known to me from Canada, the Middle States, Missouri, New Mexico, British Columbia, and California from Siskiyou to Los Angeles.

**S. nanus** Lec.—Broadly oval, outline continuous, black, shining, anterior angles of thorax often rufescent, legs reddish. Head evidently punctate. Thorax narrower in front, sides arcuate, surface sparsely punctate, equally at middle and sides, basal marginal line distinct. Elytra not closely punctate, but much more coarsely than the thorax; prosternum slightly convex, punctate, without elevated lines; metasternum at sides closely punctate, the mesocoxal line joining the suture one-fourth from apex. Abdomen closely punctate, the metacoxal line forming a complete arc nearly as long as the first segment. Length .05—.06 inch.; 1.25—1.50 mm.

As in *punctum* the male has the fifth ventral feebly impressed at tip, the female has six distinct segments, the suture between the first two ventrals is not so completely obliterated as in that species.

The thorax may have the apical angles reddish, but never very conspicuously so, but the thorax may be entirely black. This species resembles *punctum* closely, and the only reliable character for their separation is in the form of the metacoxal line, here the arc is very nearly as long as the first segment, in that but little more than half. The punctuation of the sides of the thorax—coarse in *punctum*, very fine and sparse in *nanus*, is a fairly good character, but variable to an extent leading to doubt.

*Hab.*—Specimens have been seen from Michigan, Middle States, Florida, New Mexico, Arizona and California.

**S. utilis** n. sp.—Broadly oval, convex, piceous black, shining, mouth parts, antennæ and legs yellow, pubescence sparse, erect. Head indistinctly punctate. Thorax much narrower in front, sides feebly arcuate, basal marginal line distinct, surface almost smooth, a few fine, indistinct punctures. Elytra relatively coarsely, sparsely, but not deeply punctate, each puncture with a nearly erect grayish hair; prosternum flat, without elevated lines; metasternum smooth, slightly punctate at sides, mesocoxal arc short, joining the suture near the front angle. Abdomen with six distinct segments, sparsely punctate, the metacoxal arc entire, nearly as long as the segment. Length .03—.04 inch.; 1 mm. and less.

This species resembles some of the smaller forms of *nanus* and *punctum*, but may be known from these as well as any others in our fauna by the nearly erect, sparse hairs of the surface.

*Hab.*—Florida, Tampa, Barstow, Crescent City and Haulover (coll. Hubbard and Schwarz). A specimen in bad condition in my collection from Albuquerque, N. Mex., probably belongs here. This *Scymnus* is predatory on *Aleyrodes citri*.

**S. punctatus** Mels.—Oblong oval, more than half longer than wide, black, shining, each elytron with a small, oval, red spot near the centre. Head sparsely punctate. Thorax slightly narrower than the elytra, narrowed in front, sides nearly straight, arcuate near front angles, disc distinctly punctate, the punctures evenly disposed, basal marginal line distinct. Elytra a little wider at base than

the thorax, coarsely and moderately deeply, but not closely punctate; prosternum without elevated lines; metasternum sparsely punctate at the sides, the mesocoxal line feebly curved, joining the suture one-third from the front. Abdomen sparsely punctate, the metacoxal line forming a complete arc very little broader than long and nearly as long as the segment. Legs black or piceous. Length .06 inch.; 1.5 mm. Pl. II, fig. 2.

In the male the last ventral is feebly emarginate at tip. This species varies a little in the size of the red elytral spot. In one specimen before me from Texas the spot extends obliquely to the suture. The absence of the prosternal elevated lines seems to relate this species to the forms with the incomplete metacoxal arc.

I have in my cabinet one specimen in which the elytra are entirely black without spot. Its other characters are those of *punctatus*. I feel unwilling to separate it as a distinct species, inasmuch as the Canadian specimens show quite a variation in the size of the elytral spot. The specimen is from Eagle Harbor, Lake Superior.

*Hab.*—Canada, Pennsylvania and Texas.

**S. coniferarum** Crotch.—Oblong oval, fully one-half longer than wide, black, anterior angles of thorax pale, elytra reddish, black along the base and two-thirds of the suture and sides. Head sparsely punctate. Thorax slightly narrowed in front, sides very feebly arcuate, surface sparsely indistinctly punctate. Elytra a little wider at the base than the thorax, sparsely punctate; prosternal elevated lines well marked, parallel and entire; metasternum sparsely punctate at sides, the mesocoxal line feebly arched joining the suture one-fourth from the front. Abdomen sparsely punctate, metacoxal line forming a complete arc, two-thirds the length of the segment. Legs black. Length .06—.08 inch.; 1.5—2 mm.

The only variation observed is in the extent of the red coloration of the elytra. Sometimes they are entirely red, or the base and two-thirds of suture and side margin piceous, or the piceous may extend to the apex along the suture and side thus enclosing a large oval discal spot. A specimen from Veta Pass, Col. (Schwarz), has the thorax entirely black and the legs reddish. This may be a distinct species, but the material at hand is not sufficient to establish it.

*Hab.*—California from Tahoe and Alameda south to San Bernardino, Nevada, Colorado, Veta Pass.

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## Synonymy and Bibliography.

SCYMNUS Kug.

**S. balteatus** Lec., Proc. Am. Philos. Soc. 1878, p. 399.

**S. bigemmeus** n. sp.

**S. Liebecki** n. sp.

**S. myrmidon** Muls., Spec. Sec. p. 954.

- S. quadritæniatus* Lec., loc. cit. p. 400.  
*S. xanthaspis* Muls., loc. cit. p. 952.  
*S. terminatus* Say, Bost. Jour. i, p. 203; edit. Lec. ii, p. 671; Muls., loc. cit. p. 952; Lec., Proc. Acad. 1852, p. 136.  
*S. femoralis* Lec., loc. cit. p. 136.  
*S. debilis* Lec., loc. cit. p. 137.  
*S. intrusus* n. sp.  
*S. bivulnerus* n. sp.  
*S. bisignatus* n. sp.  
*S. flavifrons* Mels., Proc. Acad. 1847, p. 181; Lec., loc. cit. p. 136; *bioculatus* Muls., loc. cit. p. 960; Lec., loc. cit. p. 136; *guttiger* et *marginellus* vars. Muls., loc. cit. p. 965.  
*S. sordidus* n. sp.  
*S. ornatus* Lec., loc. cit. p. 135.  
*S. coloradensis* n. sp.  
*S. amabilis* Lec., loc. cit. p. 135.  
*S. guttulatus* Lec., loc. cit. p. 136.  
*S. nebulosus* Lec., loc. cit. p. 137.  
*S. Phelpsii* Crotch, Trans. Am. Ent. Soc. 1874, p. 77.  
*S. circumspectus* n. sp.  
*S. opaculus* n. sp.  
*S. americanus* Muls., loc. cit. p. 965; Lec., loc. cit. p. 137.  
*S. caurinus* n. sp.  
*S. pallens* Lec., loc. cit. p. 137.  
*S. cinctus* Lec., loc. cit. p. 137; *suturalis* || Lec., loc. cit. p. 138; *LeContei* Crotch, Revision, p. 264.  
*S. pacificus* Crotch, Trans. Am. Ent. Soc. 1874, p. 77.  
*S. strabus* n. sp.  
*S. flebilis* n. sp.  
*S. fraternus* Lec., loc. cit. p. 138; ? *creperus* Muls., loc. cit. p. 985; *astutus* Muls., loc. cit. p. 986; *hæmorrhous* Lec., loc. cit. p. 138.  
*S. Brullei* Muls., loc. cit. p. 984.  
*S. semiruber* n. sp.  
*S. puncticollis* Lec., loc. cit. p. 139.  
*S. collaris* Mels., Proc. Acad. 1847, p. 180; *chatchas* Muls., loc. cit. p. 986; *fastigiatus* Muls., loc. cit.; *caudalis* Lec., *consobrinus* Lec., loc. cit. p. 139.  
*S. cervicalis* Muls., loc. cit. p. 984; Lec., loc. cit. p. 139; var. ? *socer* Lec., l. c.  
*S. abbreviatus* Lec., loc. cit. p. 140.  
*S. marginicollis* Mann., Bull. Mosc. 1843, p. 313; Muls., loc. cit. p. 1053; Lec., loc. cit. p. 140.  
*S. ardelio* n. sp.  
*S. lacustris* Lec., loc. cit. p. 140.  
*S. tenebrosus* Muls., loc. cit. p. 989; Lec., loc. cit. p. 140.  
*S. punctum* Lec., loc. cit. p. 141.  
*S. nanus* Lec., loc. cit. p. 140.  
*S. utilis* n. sp.  
*S. punctatus* Mels., Proc., Acad. 1847, p. 180.  
*S. coniferarum* Crotch, Trans. Am. Ent. Soc. 1874, p. 77.

*Not Identified.*

*S. icteratus* Muls., loc. cit. p. 969.

*S. cyanescens* Muls., loc. cit. p. 993.

*S. atramentarius* Boh., Eug. Resa Ins. p. 207.

*S. californicus* Boh., loc. cit.

*S. infuscatus* Boh., loc. cit. p. 208.

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ERRATUM—Page 85, line 13, for *caurinus* read *opaculus*.

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**SCYMNILLUS** n. g.

This genus is proposed for a species of the form and habitus of *Scymnus punctum*, with all the essential characters of *Scymnus*, but differing in the following particulars:

Body not pubescent, except feebly on the head and thorax. Eyes feebly emarginate and impressed, the lenses obliterated opposite the base of the antennæ. Antennæ very short, formed as in *Scymnus*; prosternum flat, elevated lines not distinct; mesocoxal line joining the met-episternal suture at middle. Abdomen composed of five segments, the first longer at middle than the next three, the suture between the first and second well marked; metacoxal line oblique, extended toward the edge of the segment, which it joins near the posterior angle.

The impression of the eyes recalls a similar character observed in *Throscus*, in which, however, the impression is better marked. My attention was first especially directed to this insect by the fact that there are but five ventral segments, while in the group (B) of *Scymnus*, with which it might be associated, there are six segments. The metacoxal line is also more oblique than in that group, and reaches the side of the segment without running parallel with the first suture.

***S. aterrimus*** n. sp.—Broadly oval and convex, margin slightly interrupted, black, shining, elytra usually without trace of pubescence. Head coarsely sparsely punctate. Thorax slightly narrowed in front, sides feebly arcuate, surface coarsely not closely punctate, basal marginal line indistinct; prosternum flat, coarsely punctured, without elevated lines; metasternum coarsely sparsely punctured and alutaceous, the mesocoxal line joining the suture near its middle. Abdomen sparsely punctate, metacoxal line feebly curved, not touching the first suture nor parallel with it. Length .04—.06 inch.; 1—1.5 mm.

The abdomen has but five segments; the pubescence of the head and thorax is sparse, but distinct; but in neither of the four specimens seen has there been any trace of pubescence observed on the elytra.

*Hab.*—Northern California and Oregon (Koebele, 40).

**CEPHALOSCYMNUS** Crotch.

This genus differs from *Scymnus* in having the anterior coxal cavities open behind. The thorax is narrower at base than the elytra and much more deeply emarginate at apex than in *Scymnus*. The head is more deeply inserted, the front vertical, the eyes narrowly oval, rather finely granulate, and in two species with a very feeble impression at the antennal insertion. The antennæ are very short and seem to be but 10-jointed. The abdomen has five segments, the sutures distinct; tarsal claws slightly broadened at base.

Crotch gives eleven joints to the antennæ, but I have not been able to see more than ten, in which respect Mr. H. C. Fall, of California, adds confirmation from an examination of a species taken by him.

The species at present known are as follows:

Elytra not ornate.

Body above black; elytra moderately coarsely, not densely punctate; eyes with slight impression.....**Zimmermanni.**

Body above brownish; elytra very coarsely and densely punctured; eyes scarcely visibly impressed.....**occidentalis.**

Elytra with two yellow spots often suffused.

Elytra not coarsely punctate; eyes distinctly notched.....**ornatus.**

**C. Zimmermanni** Cr.—Broadly oval, slightly convex, black, slightly bronzed, pubescence gray and irregular. Head moderately coarsely and not closely punctate. Eyes feebly impressed, not twice as long as wide; labrum conspicuously yellow. Thorax fully three times as wide at base as long at middle, coarsely and closely punctured, densely at the sides, no basal marginal line. Elytra broader at base than the thorax, about one-fourth longer than wide, surface more coarsely punctate than the thorax, but less closely; prosternum short and broad, nearly smooth without elevated lines; metasternum smooth at middle, punctate at sides; mesocoxal arc joining the suture one-fourth from the front. Abdomen scarcely punctate, metacoxal arc entire, half the length of the segment. Legs piceous, tibiæ and tarsi paler. Length .06—.08 inch.; 1.5—2 mm. Pl. II, fig. 10.

Crotch describes this species as dark green, which is the result of slight immaturity with the mixture of slight bronze of the surface and the pale hairs.

The type was collected in South Carolina, others are known to me from District of Columbia and Maryland.

**C. occidentalis** n. sp.—Oval, slightly oblong, feebly convex, paler piceous with grayish pubescence. Head moderately closely punctate. Thorax three times as wide as long at middle, sides feebly arcuate, surface closely punctate, densely and rather roughly at the sides. Elytra wider at base than the thorax, surface coarsely and closely punctate, roughly near the umbone; prosternum



nearly square, without elevated lines; metasternum at sides obsoletely coarsely punctate, the mesocoxal line indistinct. Abdomen sparsely punctate, the metacoxal are entire, but short and indistinct. Legs paler than upper surface. Length .07 inch.; 1.75 mm.

In this species the eyes are much narrower than in the other species and the impression at the lower end so feeble that it might readily escape notice.

*Hab.*—Southern California, Los Angeles and southward.

**C. ornatus** n. sp.—Broadly oval, moderately convex, piceous, pubescence gray, directed irregularly, each elytron with two irregularly oval yellow spots not sharply defined, sometimes large, suffused and united. Head moderately coarsely and closely punctate. Eyes with well defined impression at lower angle. Thorax nearly three times as wide as long at middle, slightly narrower in front, sides feebly arcuate, surface moderately punctate. Elytra not closely nor deeply punctate; prosternum broader than long, flat, without elevated lines; metasternum punctate at the sides, the mesocoxal line joining the suture one-third from the apex. Abdomen sparsely punctate, metacoxal arc entire not half as long as the segment. Legs piceo-testaceous. Length .06—.08 inch.; 1.5—2 mm.

No sexual differences have been seen in the six specimens examined. No great variation has been observed, excepting that the spots on the elytra extend and become more or less suffused. The abdomen is piceous, sometimes with the entire border paler.

This species resembles somewhat *Sc. guttulatus*, and apparently has been mixed with it in collections.

*Hab.*—California, Siskiyou to Alameda, also Catalina Island.

### **RHIZOBIUS** Steph.

This genus differs from *Scymnus* in the antennæ reaching to the hind angles of the thorax. The vestiture consists of the usual pubescence of *Scymnus* with numerous short, erect hairs irregularly placed on the elytra.

*R. lophanthæ* Blaisd. (*Scymnus*), Ent. News, March, 1892, p. 51; *toowoombæ* Blackb., Trans. Royal Soc. South Aust. xv, December, 1892, p. 254.

Form of *Sc. collaris*.—Head and thorax reddish yellow, the latter with a central cloud variable in distinctness. Elytra piceous, with feeble æneous lustre; underside and legs reddish yellow.

It is unfortunate that an intentionally introduced insect should have been first named in the country of its expatriation.

Introduced from Australia, Brisbane.

*R. debilis* Blackb.—This species in color and form resembles *Sc. pallens* or *Phelpsii*. It has attained but little foothold.

Introduced with the preceding.

**NOVIUS** Muls.

Two species of this genus have been introduced into California for their utility in the destruction of *Icerya purchasi*, which threatened to destroy, or very greatly injure the orange and lemon trees of that State.

**N. cardinalis** Muls.

This insect was originally described as *Vedalia*, but recent researches place it in *Novius*. Chapuis places these two genera in separate groups, and as these two groups, *Ortaliites* and *Scymnites*, are separated especially by the thorax narrower at base than the elytra in the former it would seem preferable to remove *Novius* from the *Scymnites* and place it nearer to *Rodolia* and *Vedalia*.

**N. cardinalis** Muls.—A species as large as *Exochomus marginipennis*, but more depressed. Its elytral markings are strikingly similar to some of the varieties of that species. The elytra are red, the suture narrowly black, with two slight enlargements, the apex is black, extending one-third or more to humerus and at its end expanded, a spot partly surrounding the umbone and an oval spot one-third from apex. The legs are black, often with the tibiae and tarsi carmine-red. Pl. II, fig. 9.

This insect is now thoroughly acclimated in the citrus growing regions of California, and very full accounts of it have appeared in many publications in that State and in "Insect Life," Washington.

Introduced from New Zealand.

**N. Koebelii** Olliffe.

This is somewhat smaller than *cardinalis*. The elytra are reddish, the suture narrowly black, the same color extending around the apex and sides to middle. Specimens are frequent with the elytra entirely red. Thorax entirely black, while that of *cardinalis* is pale at the sides.

This species does not seem to have gained the footing of *cardinalis* although fairly acclimated.

Specimens were given me by Mr. A. Koebele, who was instrumental in introducing them from Australia, their native region.

**COCCIDULA** Kug.

This genus is usually placed in a group without other associates, distinguished from all the pubescent *Coccinellidae* by the faint attempt at a stria arrangement of some larger punctures. It must, however, be admitted that this character seems to fail almost entirely and can be seen better by faith than with the lens.

Two species occur in our fauna.

*C. lepida* Lec., Proc. Acad. 1852, p. 232. The figure (Pl. II, fig. 12) gives a fair idea of the form and markings of this species, otherwise well described by Dr. LeConte.

Occurs in Canada and the New England States as far south as the latitude of Philadelphia.

**C. occidentalis** n. sp.—Oblong, subdepressed, finely pubescent, above in great part yellowish red, except head and elytral markings piceous, beneath piceous, except the last three ventral segments and legs, which are yellow. Head sparsely punctate. Thorax more closely punctate. Elytra much more coarsely punctate, a few of the larger punctures with faint serial arrangement; color yellow, sides and base piceous, a sutural stripe joining the base and ending in a cordiform spot one-third from apex. Length .12 inch.; 3 mm. Pl. II, fig. 11.

In comparing this species with *lepida* the following differences will be observed. In the markings of the elytra there is an absolute constancy in the comparatively large series of both species scarcely the slightest variation has been observed. In *occidentalis* there is a sutural stripe ending in a cordiform spot; in *lepida* there is no sutural stripe and the spot is isolated and transversely oval. On the under-side the first two segments are entirely piceous in *occidentalis*, but yellowish at sides in *lepida*.

On comparing the forms of the two *lepida* is narrower; it has also in many specimens a slight tendency to have the sides of the thorax angulate. In *lepida* the elytral punctures are, on the whole, coarser, and the serial arrangement of some coarser ones better marked.

*Hab.*—Wyoming to Vancouver.

#### EXPLANATION OF PLATE I.

- Fig. 1.—*Scymnus quadriteniatus* Lec.  
 “ 2.— “ *coloradensis* Horn.  
 “ 3.— “ *bigemmus* ♂ Horn.  
 “ 4.— “ “ ♀  
 “ 5.— “ *balteatus* Lec.  
 “ 6.— “ *Liebecki* Horn.  
 “ 7.— “ *flavifrons* Mels.  
 “ 8.— “ *amabilis* Lec.  
 “ 9.— “ *myrmidon* Muls.  
 “ 10.— “ *bivulvulus* Horn.  
 “ 11.— “ *bisignatus* Horn.  
 “ 12.— “ *ornatus* Lec.  
 “ 13.— “ *guttulatus* Lec.  
 “ 14.— “ “ var.  
 “ 15.— “ *terminatus* Say.  
 “ 16.— “ *sordidus* Horn.

#### EXPLANATION OF PLATE II.

- Fig. 1.—*Scymnus collaris* Mels.  
 “ 2.— “ *punctatus* Mels.  
 “ 3.— “ *fraternus* Lec.  
 “ 4.— “ *circumspectus* Horn.  
 “ 5.— “ *cinctus* Lec.  
 “ 6.— “ *strabus* Horn.  
 “ 7.— “ *pacificus* Crotch.  
 “ 8.— “ *Brullei* Mels.  
 “ 9.— *Novius cardinalis* Muls.  
 “ 10.— *Cephaloscymnus Zimmermanni* Crotch.  
 “ 11.— *Coccidula occidentalis* Horn.  
 “ 12.— “ *lepida* Lec.



